

### **REMARKS**

Claims 1-9 are the claims pending in this application. Applicants have canceled claim 10 consistent with the Examiner's made during the Interview of 7 October 2009. Further to the Interview as well as the After Final Amendment and Preliminary Amendment of August 17, 2009, which were re-submitted on September 14, 2009, Applicants respectfully submit this Supplemental Amendment amending Claim 1. Accordingly, Applicants affirm the comments in the Interview Summary of 7 October 2009. No new matter has been added.

#### **I. Prior Art Rejections**

Applicants have amended the claims consistent with the comments provided by the Examiner during the Interview in an effort to overcome the prior art of record and clarify the claimed scope of the invention consistent with the Specification.

Notwithstanding the previously filed After-Final Amendment of August 17, 2009, which specifically attempts to distinguish the prior art from Applicant's claimed invention, and without unnecessarily re-stating these comments, Applicants, below, provide the major changes to claim 1 in response to the references along with identifying the support for such amendments in the Application.

Regarding the language, whererin the final material comprises a structure of at least two homogeneous materials separated by a continuous compositional gradient, the Specification supports this amendment by providing that the structure of the gradient is no longer a step from Formulation A to Formulation B but a smooth and continuous change from 100 percent A to 100 percent B following the residence model for the

specific extruder. (See Page 10, lines 11-14; Page 14, lines 16-18; and Page 15, lines 17-21).

In response to Muller, Applicants amend the claim by providing that wherein introducing disturbances comprises said raw ingredients are extruded while a first set of operation parameters are selected that lead up to steady state conditions, which run at a hold time, upon which the process is disturbed to a second set of operation parameters for a specific period of time before a return to said first set of operation parameters, which results in the final material. The Specification supports this amendment by providing that a strand of Formulation A is extruded, that is, under a first set of operation parameters, where the process is allowed to continue to a steady state, which runs at a hold time. Please note, Examiner indicated that this part of the claimed invention description was clear. Further, the Specification indicates that after the hold time, the process is disturbed where new feed rate changes are made in one step, that is, the process is disturbed to a second set of operation parameters, where after the delay time has passed, the structure changes from 100 percent of Formulation A via a transition material portion, that is, a gradient portion with a "smooth and continuous change" to 100 percent of Formulation B. Importantly, and further, the reverse gradient is made by allowing a certain length of Formulation B to extrude and return the feed rates to produce Formulation A, that is, back to the first set of operation parameters, which results in the final material. (See Page 14, line 16-Page 16, line 6).

Regarding Piovoso, Applicants have amended claim 1 by providing that predicting a gradient architecture of the gradient material by utilizing one of time and volume residence distribution functions with a functional description of the disturbances.

The Specification supports this amendment by providing that the output, that is, the composition gradient, can be predicted by the general relationship between the convolution of the residence distribution function and the measured response function using either time or volume. In addition, analysis is used to identify the feed conditions necessary for determining the residence distribution function. Accordingly, the gradient architecture is easily "predicted" by integrating the measured response from a perturbation to an input. (See Page 4, line 16-Page 5, line 5; Page 7, line 4-Page 9, line 15).

Finally, regarding Schneider, Applicants have amended claim 1 to clarify employing multiple feed streams of raw ingredients at variable, feed rates for compounding and extruding a final material in the twin-screw extruder structure. The Specification supports this amendment in the equipment and layout of a standard twin-screw extruder system. (See Application, Page 4-15; and Figures 1 and 2).

## II. Formal Matters and Conclusions

In view of the foregoing, Applicants submit that claim 1-9, all the claims presently pending in the application, is patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

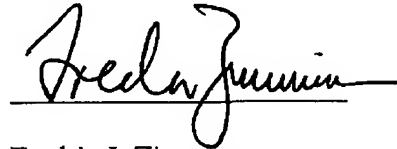
Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

Please charge any deficiencies and credit any overpayment to Attorney's Deposit

Account Number 50-1114.

Respectfully submitted,

Dated: 13 October 2009



Fredric J. Zimmerman  
Registration No. 48, 747

Department of the Navy  
Office of Counsel  
3824 Strauss Ave., Suite 103  
Indian Head, MD 20640-5152